



REVIEW ON DIABETES MELLITUS: TYPES ,SYMPTOMS, TREATMENT

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ABSTRACT :

Diabetes mellitus is a metabolic disease brought on by a malfunction in the secretion, action, or combination of both of insulin. The illness itself necessitates that the patient adapt their lifestyle to the illness and adhere to certain daily therapeutic and diagnostic guidelines. Hyperglycemia in blood, which results from insufficient insulin secretion from the pancreas or from poor insulin-directed glucose uptake by target cells, is the primary sign of diabetes mellitus. This disease, which kills silently, affects millions of individuals worldwide. An estimated 285 million persons worldwide were afflicted with this illness in 2010. If there is no improvement in treatment or control, this figure is predicted to rise to 430 million. The diagnostic standards, etiology, and genetics of various forms of diabetes mellitus, including type 1, type 2, gestational diabetes, and other forms, are contrasted. Tissue or vascular damage occurs when the condition worsens, increasing the risk of serious diabetes consequences include retinopathy, neuropathy, nephropathy, cardiovascular problems, and ulceration. Insulin and hypoglycemic medications are among the pharmacological treatments for diabetes mellitus that are now accessible. These medications work by either raising insulin production from the pancreas or lowering plasma glucose concentrations through the promotion of glucose absorption and inhibition of gluconeogenesis. Comorbid mental illnesses may also have a detrimental effect on how diabetes develops. In particular, they include eating disorders, anxiety disorders, depression, and cognitive problems like dementia. Because of their advantageous ingredients, a number of herbal medications have also shown promise in the treatment of diabetes. The causes, forms, diagnosis, and treatment of diabetes are the main topics of this article.

INTRODUCTION :

Diabetes mellitus is derived from the Latin term mellitus, which means sweet, and the Greek word diabetes, which means siphon, to pass through. A historical analysis reveals that Apollonius of Memphis first used the term "diabetes" in 250–300 BC. The term "Diabetes Mellitus" originated when ancient Greek, Indian, and Egyptian civilizations realized that the urine produced in this condition was pleasant. In 1889, Mering and Minkowski made the discovery that the pancreas plays a part in the pathophysiology of diabetes.^[1] At the University of Toronto, Banting, Best, and Collip isolated the hormone insulin from cow pancreas in 1922, which made an efficient diabetic treatment available that year. Outstanding research has been conducted over the years, leading to several discoveries and the development of management techniques to address this expanding issue.^[2] Regrettably, diabetes remains one of the most prevalent chronic illnesses both domestically and globally. It continues to rank as the seventh most common cause of death in the US.^[3]

People who have diabetes still have high blood sugar. This could be because not enough insulin is created, not enough insulin is produced, or not enough insulin is produced effectively. The two most prevalent types of diabetes are type 2 diabetes (95%), which is linked to obesity, and type 1 diabetes (5%), which is an autoimmune disease. Other types of diabetes are extremely uncommon and are brought on by single gene mutations; gestational diabetes is a type of the disease that develops during pregnancy.^[4]

TYPES OF DIABETES

- 1.Type 1 diabetes
- 2.Type 2 diabetes
- 3.Gestational diabetes

OTHER TYPES OF DIABETES

- 1.Diabetes LADA
2. Diabetes MODY

3. Double diabetes
4. Brittle diabetes
5. Diabetes insipidus
6. Neonatal diabetes mellitus

TYPE 1 DIABETES

It is a long-term autoimmune illness linked to the targeted lysis of pancreatic β -cells that produce insulin^[5]. The transplantation of pancreas from twin donors to chronically diabetic twin recipients in the absence of immune suppression is complicated because of the increased heterogeneity of β -cell pancreatic lesions, which are quickly destroyed. After infiltrating T lymphocytes, massive insulinitis develops, which is measured by an amnestic autoimmune reaction. Juvenile-onset diabetes or insulin-dependent diabetes (IDDM) are common terms used to describe type 1 diabetes.^[6]

Symptoms include

- acetone breath, thirst
- weight loss,
- frequent urination,
- nausea.

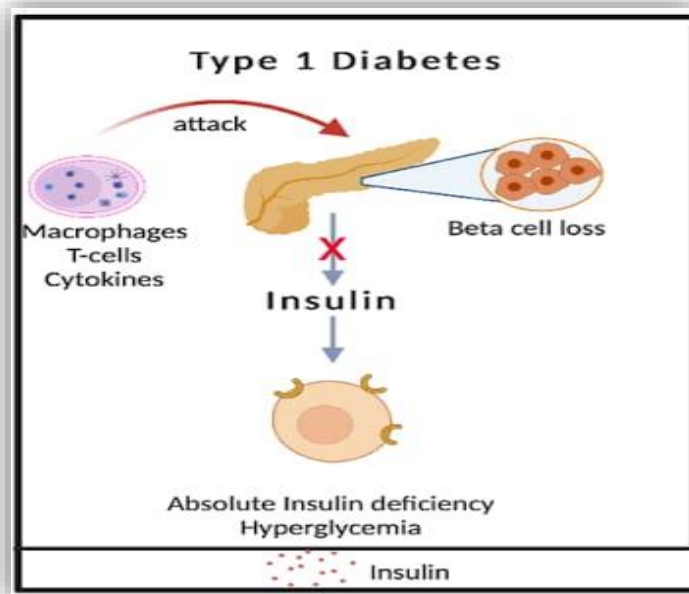


Fig. TYPE 1 DIABETES

TYPE 2 DIABETES

Adult-onset diabetes is another name for type 2 diabetes mellitus. Insulin resistance as a context for the progressive insulin secretory malfunction. Individuals suffering from this kind of diabetes often exhibit resistance to the effects of insulin^[7]. It impacts 5-7% of the world's population worldwide. Hypoglycemic medications, exercise, and dietary therapy are typically used to control the condition. This is the most prevalent kind of diabetes mellitus and is closely linked to advanced age, obesity, lack of activity, and a family history of the disease^[8].

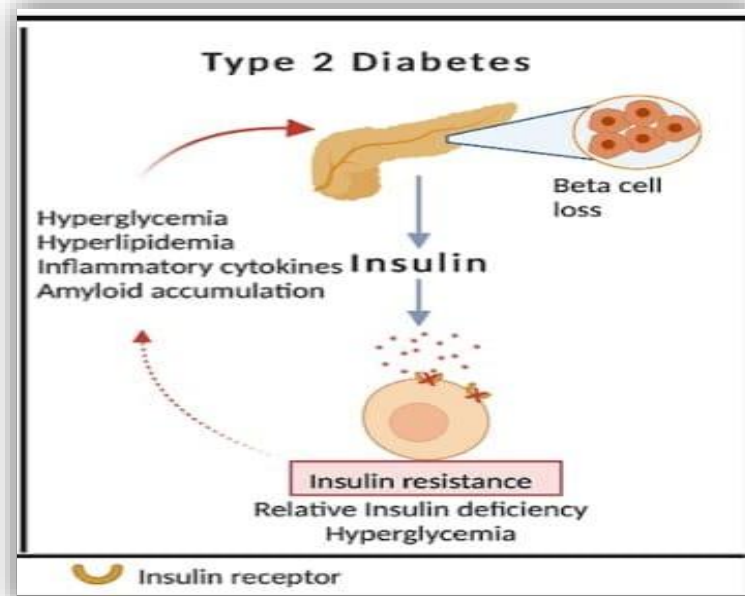


Fig. TYPE 2 DIABETES

GESTATIONAL DIABETES

Diabetes commonly develops in pregnant women. Large amounts of hormones are produced during pregnancy, and these hormones may cause insulin resistance by reducing the body's ability to use insulin. Gestational diabetes mellitus is the term used to describe women who get diabetes mellitus during pregnancy as well as those who have undetected asymptomatic type 2 diabetes mellitus that is identified during pregnancy. The fact that GDM is linked to considerable fetal and maternal morbidity makes it clinically significant^[9].

DIABETES LADA

Adult-onset autoimmune diabetes with latent autoimmune diabetes is characterized by the absence of autoantibodies linked to diabetes, adult onset, and the absence of insulin treatment requirement for a while after diagnosis. It's starting to become clear that certain individuals may have a slowly progressing form of Type 1 diabetes, which is identified by autoantibodies. Some individuals who are initially diagnosed with type 2 diabetes eventually become insulin-dependent; these individuals may have LADA, a slowly progressing variant of type 1 diabetes.

DIABETES MODY

The autosomal dominantly inherited kind of diabetes known as maturity onset diabetes of the young is caused by heterozygous mutations in several transcription factors that act in the growth and maturation of pancreatic β -cells. Autosomal inheritance, early onset of diabetes, lack of symptoms of insulin resistance or the autoimmune process, and maintenance of endogenous insulin secretion are characteristics of MODY^[10].

DOUBLE DIABETES

When children and young adolescents experience hyperglycemia along with characteristics common to both type 1 and type 2 diabetes, it is referred to as double diabetes.

BRITTLE DIABETES

Diabetes type 1 is a disease that is inherently unstable. A small subset of type 1 diabetic patients—mostly young women—have poor metabolic control on a long-term basis. They are marked by severe glycemia value instability and frequent, unpredictable episodes of hypoglycemia or diabetic ketoacidosis that are not related to mistakes made by patients or medical professionals. These patients' quality of life is severely impacted, especially due to the frequent occurrence of acute events, hospital stays, and early onset of chronic problems. Brittle diabetes has been identified as this clinical condition^[11].

DIABETES INSIPIDUS

Large amounts of diluted urine are expelled as a result of vasopressin shortage, AVP resistance, or excessive water consumption in people with diabetes insipidus. Urine volumes greater than 21 ml/24 h, or around 150 ml/kg/24 h at birth, 100–110 ml/kg/24 h till the child is two years old, and 40–50 ml/kg/24 h in older children and adults, are indicative of polyuria.

NEONATAL DIABETES MELLITUS

- In the first six months of life, it happens.
- One gene defect
- Insufficient insulin production
- Slow weight gain
- Elevated plasma glucose, misdiagnosed as type 1 diabetes^[12]

Treatment

The physiology and treatment of diabetes are complicated and call for a wide range of interventions in order to successfully manage the disease. Diabetic education and patient engagement are essential components of diabetes management. Patients who are able to self-manage their diet (restrictions on carbohydrates and total calories), exercise frequently (more than 150 minutes per week), and independently monitor their blood sugar do better.[13] Lifelong treatment is frequently required in order to prevent unintended complications. Ideally, blood sugar levels should be maintained at 90 to 130 mg/dL and HbA1c at less than 7%. Although glucose control is important, overly aggressive management may result in hypoglycemia, which can have disastrous or deadly consequences^[14].

The cornerstone of treatment for type 1 diabetes is insulin administration through daily injections or an insulin pump, as the disease is largely caused by an insufficient supply of insulin. In the early stages of type 2 diabetes, diet and exercise may be sufficient therapies. Other treatments can focus on improving insulin sensitivity or raising the pancreas' production of insulin. Biguanides (metformin), sulfonylureas, meglitinides, thiazolidinediones, alpha-glucosidase inhibitors, glucagonlike-peptide-1 agonist, dipeptidyl peptidase IV inhibitors (DPP-4), selective amylinomimetics, and sodium-glucose transporter-2 (SGLT-2) inhibitors are some of the specific drug subclasses^[16]. The first drug used to treat diabetes is metformin, which lowers basal and postprandial plasma glucose^[15]. Patients with type 2 diabetes may also require insulin treatment, particularly if their glucose control is inadequate and their condition is progressed. Bariatric surgery is a potential way to correct glucose levels in patients who are severely obese^[17]. It is advised for people with serious comorbidities and those who have not responded to previous treatments^[18]. Liraglutide and semaglutide, GLP-1 agonists, are correlated with better

cardiovascular outcomes^[19]The SGLT-2 inhibitors canagliflozin and empagliflozin have also been demonstrated to enhance cardiovascular outcomes, possibly providing renoprotection, and to delay the onset of heart failure^[20]

CONCLUSION :

Diabetes has no known cure and is a slow killer. However, with appropriate knowledge and prompt treatment, its problems can be minimized. Heart attack, kidney damage, and blindness are the three main side effects. Maintaining precise control of a patient's blood glucose levels is crucial to preventing problems. Tight blood glucose control poses a challenge since it might result in hypoglycemia, which can cause far more serious problems than elevated blood glucose levels. Researchers are currently searching for different approaches to treating diabetes. This study aims to provide a broad overview of the state of diabetes research at the moment. The author hopes to inspire a new generation of researchers to take on the problems of diabetes research, seeing it as one of the most demanding fields in the twenty-first century. The heterogeneous nature of the disease and its range of clinical manifestations are reflected in the classification of DM. Insulin resistance is a hallmark of diabetes patients, and an increasing body of clinical and experimental data suggests that insulin resistance plays a significant role in the pathophysiology of the illness.

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